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Journal of the Society of Arts.

FRIDAY, MARCH 8, 1861.

INTERNATIONAL EXHIBITION OF 1862.—GUARANTEE DEED.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, as well as others who take an interest in the Exhibition, will make it convenient to call there and attach their signatures to the Document.

GUARANTEE FUND FOR THE EXHIBITION OF 1862.

The following additions have been made since the last announcement in the *Journal* for March 1:—

⁂ *The names marked with an asterisk are those of Members of the Society of Arts.*

NAME.	AMOUNT.	REPRESENTING THE OBJECTS OF THE SOCIETY—ARTS, MANUFACTURES, AND COMMERCE.
*John Jackson, jun., 49, Rathbone-place, W.C.	£100	Arts.
James Mc Connel, Manchester	100	Commerce.
James Reiss, Manchester	500	Commerce.
*Benj. Dobson, Mere Hall, Bolton, Lancashire	100	Commerce.
B. M. Power, 19, Gresham-street, S.W.	2,000	Commerce.
Birkbeck and Tongue, 24, Southampton-buildings, Chancery-lane, E.C.	300	Manufactures.
Sir Charles Lyell, 53, Harley-street, W.C.	300	Commerce.
Norman Mac Leod (of Mac Leod), 9, Cambridge-square, Hyde-park, N.W.	500	Commerce.
Geo. Doveston (Doveston, Bird, and Hull), Manchester	300	Commerce.
Joseph Heron, Manchester	250	Commerce.
William Agnew, Manchester	100	Commerce.
Henry Stubbs, Manchester	200	Commerce.
James Standring, Margate (Mayor of)	100	Arts.
Thomas Agnew, Manchester	100	Commerce.
John Fowler, C.E., 2, Queen's-square-place, S.W.	1,000	Commerce.
Wm. Henry Cremer, jun., 210, Regent-street, W.	200	Arts.
John Robinson (Sharp, Stewart, and Co.) Manchester	500	Manufactures.
Robert Gardner, Manchester	500	Commerce.
Harrison Blair, Manchester	200	Commerce.
Sigismond James Stern, Manchester	500	Commerce.
John Siltzer (Siltzer and Co.), Manchester	500	Commerce.
John Pender (Pender and Co.), Manchester	500	Commerce.
Thomas Ashton, Manchester	500	Commerce.
Thos. Hoyle and Sons, Mayfield Print Works, Manchester	1,000	Manufactures.
John Stevenson, Canal Foundry, Preston	100	Commerce.

By Order, P. LE NEVE FOSTER, *Secretary.*

THIRTEENTH ORDINARY MEETING.

Wednesday, March 6, 1861.

The Thirteenth Ordinary Meeting of the One Hundred and Seventh Session, was held on Wednesday, the 6th inst., Sir Thomas Phillips, Chairman of the Council, in the chair.

The following gentlemen were proposed for election as members of the Society:—

Adam, James S.	8, Philpot-lane, E.C.
Allhusen, Christian	Newcastle-on-Tyne.
Arthur, James Kennedy	18, Somerset-street, Portman-square, W.
Brooke, William	Brook-street, Manchester.
Burke, John S.	4, Queen-square, Westminster, S.W.
Chambers, George	11, George-yard, Lombard-street, E.C.
Dumergue, Edward	Cleveland-walk, Bath.
Etches, Wm. Jeffery	The Park, Litchurch, and Derby.
Finden, Rev. George Sketchley	Brookside-house, Little Kimble, Tring.
Forster, H. Rumsey	
Gibbs, Henry Hucks	St. Dunstan's, Regent's-park, N.W.
Guedalla, H.	Gresham Club, City, E.C.
Hutchins, E. J.	6, Kensington Palace-gardens, W.
Ibbotson, Thomas H.	12, New Brown-st., Manchester.
Letts, Thomas, jun.	Sydenham, S.E.

Oakley, Henry	Great Northern Railway, King's-cross, N.
Rose, William, A.......	Queenhithe, E.C.
Stevenson, John.........	Canal Foundry, Preston.

The following candidates were balloted for and duly elected members of the Society:—

Durham, the Earl of ...	35, Grosvenor-square, W., and Coupland Castle, Wooler.
James, Jabus Stanley...	26, Watling-street, E.C.
Powis, Charles	26, Watling-street, E.C.
Wood, Thomas, Ph.D.	123, Upper Thames-street, E.C.

The Paper read was—

ON THE PROGRESS OF TEXTILE MANUFACTURES IN GREAT BRITAIN.

By Alexander Redgrave, one of H.M. Inspectors of Factories.

The object of this paper is not to give a history of the textile manufactures of this country—to sketch their rise and progress, from the days when our forefathers clothed themselves in the skins of the beasts which provided them with food and raiment, to the present day, when the delicate cambric is prized only for its beauty and lightness. The object is rather, in these days of general progress, to collect together a few facts which are to be found scattered about, and to exhibit the present extraordinary and wonderful degree of magnitude and perfection to which the production of textile fabrics by power in this country has arrived.

Historians claim for textile fabrics the earliest mention of any clothing in Holy Writ. We read that our mother Eve, exhibiting the true character of the woman as a thrifty and industrious wife, made herself a garment of fibrous material *sewed* together. The early history of clothing shows us that, in the beginning, there was produced, in every country, a sufficiency of some kind of clothing suitable and adapted for the covering and warmth of the inhabitants. If we look to the north and south poles, we find there animals whose fur and skin form the proper and sufficient dress of the inhabitants of those ice-bound shores; while if we look to India, we there find the garden of the cotton plant, and materials made from it suitable and proper for covering in the varied seasons of that magnificent peninsula. But the intercourse of nation with nation, and the happy knowledge gained in that intercourse, that one country possessed that which might be useful to another, and which might be exchanged for that which was also serviceable to itself, led to the interchange of commodities, the gradual adoption of new customs and the creation of new wants which required to be satisfied. Thus the primeval dress of our first parents, which has been variously denominated as "aprons" and "breeches," was gradually superseded by other and more enduring habiliments, and their descendants, becoming acquainted with the art of manufacture, and being imbued with the knowledge of colour, arrayed their loved ones in "coats of many colours;" and when they mourned, they sat, as did Israel when bewailing the loss of Joseph, in "sackcloth."

The manufacture of fibres was, in early days, an employment of the noble and great,—it was not confined to the servile classes. The occupation was analogous, probably, to the embroidery and needle-work of the present day. As ladies now embroider altar-cloths and velvet-hangings for our churches, so did the children of Israel of old bring free gifts for the tabernacle, as we read in Exodus:—"And all the women that were wise-hearted did spin with their hands, and brought that which they spun, both of blue and of purple, and of fine linen." Quotations might be multiplied *ad infinitum*, showing the estimation in which these arts were held, and the prosecution of them by women of high degree. In the "Odyssey," Homer makes Antinous thus describe the occupation of Penelope, who puts off her suitors until she shall have completed her web, of which, however, she unravelled at night the portion she had woven during the day, in order to postpone the announcement of her decision:—

> "While she laborious, in delusion spread
> The spacious loom, and mixed the various thread."

And again, in the "Iliad," Homer bears testimony to the coquetry in little things among the damsels of his day, for he describes the running of Ulysses, in the races at the funeral games in honour of Patroclus, thus:—

> "Next Ulysses, measuring pace with pace
> Behind him, diligently close he sped;
> As closely following as the running thread
> The spindle follows, and displays the charms
> Of the fair spinner's breast and moving arms."

Descending nearer to our own country and our own times, it is said that the mother of Alfred the Great was skilled in spinning, in which art she also taught her daughters to be proficients, and Alfred himself was accustomed to call the female branches of the family the "spindle-side" of the house; and I am certain that this derivation of the term "spinster" ought to prevent its use in any sense but as a mark of honourable distinction. One of the most distinguished orders of knighthood, *i.e.*, the Order of the Golden Fleece, was instituted by Philip the Good, Duke of Burgundy, in 1429, not to mark any distinguished act of gallant and honourable feeling, as that which prompted the institution of the Order of the Garter, but on the occasion of that prince having made an enormous profit by the sale of wool, for which his territories were then noted, territories which still produce some of the finest wool; and the creation of this order of knighthood was a just tribute to the enterprise and intelligence of the burghers and traders in that fruitful and rich kingdom.

As, however, population increased, and the necessity for the production of the coarser kinds of clothing became more urgent, the occupation of spinning and weaving descended in the scale, and became the employment of the lower classes. In this country, doubtless, wool was the chief material used for clothing, although flax was also much worn, but the climate, the heat and cold, the sunshine and rain, were best provided against by the former.

Wool entered most into the economy of dress from its adaptation either as a lighter or a heavier substance, to meet the sudden and frequent changes of temperature, to which as islanders we are subject. Our woollen manufactures were, however, greatly improved by the introduction of foreign weavers by Edward III. and Queen Philippa, in the 14th century, and subsequently by other sovereigns. These artisans were brought from the Low Countries, in which the manufacture of textile fabrics, especially of wool, then flourished. They introduced new kinds of goods, and gave a great impetus to the woollen manufacture. But according to the principle of those days, a principle which, moreover, has not long ceased to prevail in the present day, the woollen manufacture required "protection." The legislature, therefore, at a very early day, prohibited the exportation of English wool, and imposed a heavy fine upon the wearer of any foreign cloth. It continued to protect the manufacture in the time of Charles II., by ordering the shrouds of all persons to be made of woollens; in the days of William III., of Anne, of George I., and George III., by prohibiting the importation of the printed calicoes of the East, by imposing a heavy fine upon the wearer of such printed calicoes; by imposing a duty of 3d., and afterwards 6d., per yard upon the printing of calicoes; by requiring linen to be used as warp, and by various other vexatious enactments. Notwithstanding the grievances of the woollen manufacturers, even in those days of sumptuary regulation, cotton goods found their way into the country, and were appreciated to their full value, admirably suited, as they are, for a climate such as ours, and for domestic purposes amongst our household. The want once created in this country was followed, as a matter of course, by the attempt to supply that want, as much as possible, by our own means. The raw material was imported, and manufacturers endeavoured to compete with the productions of India. They were, however, hampered by the legislative restrictions which I have already noticed, by being required to use linen as a warp, and other like regulations, but little by little these regulations were abolished, until at last the excise upon the printing or dyeing of British made calicoes was repealed in the year 1831.

The change from the manual labour of the spinning-wheel to the factory system, commenced by the erection of mills in which the machinery was moved by water. The valleys of Lancashire and Yorkshire became covered with mills, as the streams had generally a considerable fall, and were thus well adapted for water-wheels. Sir Richard Arkwright erected his mills upon streams in Derbyshire, from which cause the twist spun by him was originally called water-twist. It is just one hundred years since the first improvements were broached. The spinning-wheel was, in 1760, the ordinary machine in use for spinning all kinds of fibres, producing one thread at a time; but the demand for cotton goods, which had become fully appreciated, caused the improvements which began with the invention of a spinning machine turned by the spinner's hand, for producing eight threads at a time instead of one, and which have been followed by the adaptation of the principle of that machine to produce 1,200 threads at a time by the motion of the steam-engine.

Four names have been associated with improvements in cotton machinery, who, if not all of them the actual inventors, were the utilisers and practical adapters of ideas which had been unfruitful until their discernment discovered the value of them,—Arkwright, Strutt, Hargreaves, and Crompton; these men, and others who succeeded them, completely revolutionised the trade of cotton-spinning. The domestic occupation carried on in cottages, upon rude machinery, requiring for the production of the fabric no slight bodily labour, was now transplanted into spacious factories, erected in airy and open situations, and while the bodily labour of the operative was lessened, his attention and activity were still called into full exercise. The mills erected by Sir Richard Arkwright are most interesting buildings at the present day. The sites chosen, doubtless on account of the sufficiency of the fall of the streams to move the machinery, are nevertheless situated in spots of great beauty in Derbyshire, on the Derwent and other streams. The following is a description of one of these mills—that at Cromford, or Matlock—which is still occupied by the descendants of Sir Richard Arkwright:—

" Where Derwent guides his dusky floods
Through vaulted mountains and a night of woods,
The nymph Gossypia treads the violet sod,
And warms with rosy smiles the watery god.
His ponderous oars to slender spindles turns,
And pours o'er mossy wheels his foaming urns;
With playful charms her hoary lover wins,
And wields his trident while the monarch spins.
First, with nice eye, emerging naiads cull,
From leathery pods the vegetable wool;
With wiry teeth revolving cards release
The tangled knots, and smooth the ravelled fleece;
Next moves the iron hand with fingers fine,
Combs the wide card. and forms the eternal line;
Slowly with soft lips the whirling can acquires
The tender skeins and wraps in rising spires;
With quickened pace successive rollers move,
And these retain and those extend, the rove;
Then fly the spokes, the rapid axles glow,
While slowly circumvolves the labouring wheel below."

Lower down the same river, the Derwent, we meet with two other cotton spinning mills, the spindles of which are moved by the "watery God,"—the Belper and Milford mills, belonging to the Messrs. Strutt. The systematic cleanliness and order which pervade these mills are beyond praise. The machinery is kept scrupulously clean, the floors rival the polished wainscot of a library, the walls are bright with the whiteness of limewash, the air is clear and free from dust, and those whom the poet calls "emerging naiads," and we in the vulgar tongue "factory girls," have some claim, perhaps, to the ethereal character of the poet, in that they are happy, smiling, prosperous creatures, cleanly to a degree of perfection, tidily clad, healthy and robust. The child of eight or nine years and the elderly woman must be equally clean. The habit thus inculcated so early, and insisted upon throughout, is carried with them to their homes, and an incalculable benefit is conferred upon them by these admirable regulations. But these are only a part of the characteristics of the management of these mills. The hands are known to the principals, their health is cared for, their abilities are not overtaxed, the children are educated—in fine, these establishments are not places of toil, but homes, presided over by men of enlarged sympathies and warm appreciation of their opportunities of doing good.

But the invention of Watt no longer required the manufacturer to erect his mill at the side of a rapid stream—provided he could obtain coal, he had no longer to depend upon the varying force of the Derwent, the Ribble, or the Irwell. From this date factories became gregarious, and the rapid extension of some of our manufacturing towns, and the creation of others, are due to the steam engine. One mill has arisen after another, tall chimneys, vomiting black smoke, tower above the head in every street; the machinery which moved in the old water mills at a stately although at a somewhat rapid pace, in these new steam mills rushes at a headlong speed, moaning, whirring, and clattering; the approach to the mills is through a dense population; activity, life, and business prove the altered and enlarged sphere of the factory system. With the increase of factories, the happy valleys have become busy towns—hundreds of people dwell where ten formerly had their abode; the old charities have been remodelled—new wants have been provided for by Mechanics' Institutions, evening schools, free libraries, baths, wash-houses, and parks. The increased populations congregated together under the new factory system have the sympathy of the manufacturers, who, with a wise and humane liberality, promote, by every means in their power, the amelioration of their social and physical condition.

Various duties, of customs and excise, levied upon raw produce and materials used in manufacture are happily at an end. The hindrance of excise regulations may be conceived when it is stated that the calico printer could not pack and send off his goods until every piece had been measured and stamped by the officer of Excise. The whole of the manufacturers of textile fabrics may now buy the raw material, wash, spin, weave, bleach, print, dye and stain their goods without let or hindrance from any fiscal regulations.

The full vigour of the factory system was somewhat restrained by the various restrictions to which I have already alluded, but the wise abandonment of a restrictive policy, and the adoption in its integrity of freedom from legislative regulations, gave to our manufacturers a vast impetus, the effects of which continue to the present day, in the increasing development of the trade. The following figures will enable us to appreciate the extent of our textile manufacturing establishments. They were collected in 1856, but there has been, even within the last four years, a very considerable increase and extension of the various factories in the country.

Factories in Great Britain and Ireland in 1856.

There are four classes of raw products convertible into textile fabrics:—these are cotton—wool and worsted—flax, hemp, and its tribe—and silk. Wool and worsted, although the same material, are of a different nature, and require to be manufactured in a different manner; they are, therefore, treated of separately, and it is usual to divide the textile fabrics into five classes.

The cotton trade represents more than one-half of the whole of the textile fabrics.

The woollen manufacture, once the chief textile industry of the country, ranks second in importance.

Worsted, which is obtained by separating the long fibre of the wool from the shorter staple, ranks as the third.

Flax is fourth; and silk is the fifth and last.

There are various methods of exhibiting the extent of these manufactures, in some of which, perhaps, the order in which I have enumerated them might be varied, but taking the general importance and probable value of the several branches of manufacture, the order in which they have been named will be found the most correct.

Statistics have been procured, at intervals, by the Inspectors of Factories, with reference to the establishments under their supervision, viz., those in which either of the raw materials enumerated are spun or manufactured. No account has ever been taken of the print-works, bleaching and dyeing works, lace factories, &c., which are excluded from the operation of the Factory Acts, and the following figures refer, therefore, to those establishments only in which the first processes of manufacture, up to and including the weaving, are carried on by the aid of water or steam power.

	No. of Factories.	Horse-power.
Cotton	2,210	97,132
Wool	1,505	25,901
Worsted...	525	14,904
Flax	417	18,322
Silk...	460	5,176
	5,117	161,435

	No. of Spindles.	No. of Power Looms.
Cotton	28,010,217	298,847
Wool	1,786,972	14,453
Worsted...	1,324,549	36,956
Flax	1,288,043	7,689
Silk...	1,093,799	9,260
	33,503,580	367,205

	No. of Persons Employed.		
	Males.	Females.	Total.
Cotton	157,186	222,027	379,213
Wool	45,583	33,508	79,091
Worsted	30,023	57,771	87,794
Flax	23,446	56,816	80,262
Silk	16,899	39,238	56,137
	273,137	409,360	682,497

As I have before stated, the above figures refer only to persons employed in establishments subject to the provisions of the Factory Acts, amounting to 682,497, and I have estimated, after making various calculations, and consulting the best authorities, that there are 887,369 persons employed upon textile fabrics in establishments not under the provisions of the Factory Acts, which two classes of persons have dependent upon them at least 3,000,000 of unemployed persons, representing a total of 4,568,082 persons dependent upon the textile fabrics for their maintenance; being in the proportion of 16 per cent., or one-sixth of the population. But there are others, though not directly employed upon the fabrics themselves, equally dependent upon the prosperity of textile manufactures for their subsistence—for instance:—

Those engaged in the procuring of coal (at least 3,000,000 tons are consumed per annum in factories, print-works, &c.). Those engaged in the procuring of iron—engine and machine makers. Those engaged in the leather trade, in the manufacture of grease, in the procuring of oil, dry wares, paper, skips, or baskets, and of various minor articles used in manufacturing establishments. Those employed in warehouses, &c., &c.

At a moderate computation, I reckon that the above persons and their families would raise the number of those dependent upon the textile fabrics to 20 per cent., or one-fifth of the population.

FACTORIES IN EUROPE.

Such is the manufacturing power of British factories. I regret that the means do not exist for comparing all these statements with the statistics of foreign countries. Although in some countries accurate accounts are taken by the government of the various occupations of the people, and the size and extent of industrial establishments, yet so much of that which is performed under the factory system in England, forms part of a domestic system abroad, that it is not easy to institute a comparison with foreign countries, and I am obliged, therefore, to limit the comparison to "cotton fabrics," for the which I have obtained the following statements of the principal countries in Europe.

COUNTRIES.	No. of Factories.	No. of Spindles.	No. of persons employed
Austria	202	1,500,000	30,020
Bavaria	18	558,700	12,000
Belgium	169	600,000	12,000
France...	2,394	3,457,552	244,579
Prussia...	132	194,290	5,201
Russia	70	1,400,000	50,000
Saxony	134	604,646	12,000
Switzerland...	132	1,112,625	20,000
The smaller States of Germany	30	440,000	8,000
	3,281	9,867,813	393,800
Great Britain and Ireland...	2,210	28,010,217	379,213

The above number of spindles, say in round numbers 10,000,000, are known to be in operation in certain countries in Europe, being those most engaged in industrial pursuits, and containing an aggregate population of 160,000,000. If to the remaining countries, containing a population of 55,000,000, we give 4,000,000 spindles, which is a very large estimate for Spain, Portugal, Italy, Turkey, Greece, Denmark, Holland, &c., it will be found that the continent of Europe gives employment to 14,000,000 spindles. To this number must be added the probable number in operation in America, which has been estimated not to exceed 7,000,000. There will then be a total of 21,000,000 out of England, tended by every variety of race, each with their different characteristics and habits, while in Great Britain alone there are 28,000,000, tended by industrious, intelligent, and steady operatives.

From a comparison of the Table just quoted with the first Table, the following results are obtained:—That in the United Kingdom there is one person employed in a cotton factory to every 72 of the population.

In Switzerland	One in every 100
France	„ 132
Saxony	„ 141
Prussia	„ 300
Belgium	„ 350
Bavaria	„ 416
The smaller States of Germany	„ 626
Austria	„ 1,313

And the size of the factories is shown by the following figures. The average number of spindles in a factory in the United Kingdom, is 12,600

France	1,500
Prussia	1,500
Belgium	4,000
Saxony	4,500
Austria	7,000
Switzerland	8,000
The smaller States of Germany	14,000
Russia	20,000
Bavaria	30,000

The larger proportion of spindles in the factories of Germany, Russia, and Bavaria, is owing to the very recent introduction of the factory system into those countries, and consequently to the erection in those countries of large spinning mills. For instance, there are only 18 cotton factories in Bavaria, but one of them contains 95,000 spindles and another 40,000, whereas in this kingdom the comparison is made with all classes and descriptions of factories, some built 70 or 80 years since, in which cotton undergoes some process or other of manufacture by power.

Value of Manufactured Goods in the United Kingdom, Austria, and France.

In the spring of last year, I made, for the International Statistical Congress, some calculations of the amount of capital invested in the factories of this country, and of the value of the manufactured goods produced in the year 1856. From these calculations it appeared that £55,000,000 worth of cotton goods were manufactured, of which £17,000,000 worth were consumed in this country, which is at the rate of about 12s. per head. This is, perhaps, a moderate estimate, for the consumption of cotton goods in 1859 has been calculated by Mr. Bazley, M.P., at £23,000,000, or 15s. 5d. per head per annum. This latter sum, however, represents the whole value of cotton spun and manufactured, divided by the population, but the calculation I had made was the value of cotton goods consumed as cotton goods annually in this country. A large quantity of cotton is used for warps in combination with wool and worsted, and these goods are commonly classed as woollen and worsted fabrics, and the value of the cotton used in them is included in their general value. Cotton is also used in a variety of ways with the other filaments, and, in fact, enters into every species of textile manufacture, so that my calculation of £17,000,000 of cotton wares consumed, may be considered as a fair, though perhaps a moderate, estimate.

The following shows the value of the various textile fabrics manufactured in this country in 1856:—

	Estimated value of goods manufactured.	Quantity exported.	Estimated quantity consumed in this country.
	£	£	£
Cotton	55,298,778	38,283,770	17,015,008
Wool	23,942,976	5,985,744	17,975,232
Worsted	12,715,569	6,415,569	6,300,000
Flax	15,100,000	6,262,588	8,837,412
Silk	18,900,000	2,966,938	15,933,062
Total	125,957,323	59,914,609	66,060,714

The average annual consumption in this country is as follows:—

Cotton Goods..................	£0	11	11	per head.
Woollen „	0	12	7	„
Worsted „	0	4	5	„
Flax, &c. „	0	6	2¼	„
Silk „	0	11	1¾	„
	£2	6	3	

Very full accounts have been published by the Austrian Government, giving detailed statements of the several textile industries of the empire, and they will enable us to contrast the operations of the Austrian with our own factories.

In Austria about 400,000 persons are engaged upon cotton, of whom probably 300,000 are hand-loom weavers, and they produce goods to the value of £8,000,000, which are consumed at home, and average 4s. 7d. per head.

The value of the woollen goods was £6,000,000, or 3s. 4d. per head.

The linen manufacture of Austria is said to give employment to 3,500,000 persons, the larger portion of whom are hand-spinners, only 100,000 spindles being contained in factories. They produced goods to the value of £6,000,000, being at the rate of 3s. 4d. per head.

In the silk industry 800,000 are employed, and produce goods to the value of £5,000,000, or at the rate of 2s. 10d. per head.

The case of the United Kingdom and Austria stands thus:—

The former, with 750,000 cotton workers, produced £55,000,000 worth of goods, or each worker produced to the value of £73; the latter produced £8,000,000, of which each worker produced £20 worth.

The former produced woollen and worsted goods to the value of £36,656,545; the latter produced similar goods to the value of £6,000,000.

The former, with 290,731 persons engaged in the flax and linen trade, produced goods to the value of £15,100,000, or each worker produced goods to the value of £51; the latter with 3,500,000 workers, produced goods to the value of £6,000,000, of which the workers produced 34s. worth each.

The former, with 139,235 persons engaged in the silk manufacture, produced goods to the value of £18,900,000, of which each worker produced £136; the latter with 800,000 workers upon silk, produced goods to the value of £5,000,000, of which each worker produced £6 worth.

The textile fabrics produced in the United Kingdom, with a population of 27,000,000, were valued at £125,000,000, while in Austria, with a population of 35,000,000, they amounted only to £25,000,000.

The relative quantities consumed per head are as follows:—

	The United Kingdom.				Austria.		
	£	s.	d.		£	s.	d.
Cotton goods ...	0	11	11	...	0	4	7
Woollen	0	12	7	...	0	3	4
Worsted	0	4	5				
Flax	0	6	2¼	...	0	3	4
Silk	0	11	1¾	...	0	2	10
	£2	6	3		£0	14	1

It is a pity that a similar comparison cannot be made with the other countries, of which some particulars are given in the table, in order that the manufacturing capacity of this country might be tested with that of Prussia and Saxony, for instance, who are our rivals in the production of some classes of fabrics. We are likely, however, to press our claims now for some share in the supply of textile fabrics in France. Before the recent treaty our fine cotton yarn was indispensable in France for the manufacture of lace, and consequently it was admitted, while coarser yarns were prohibited, and it cannot be doubted that the superiority of our cotton goods, taking into consideration quality with cheapness, must, before long, commend them to the French people, who now pay dearly for cotton goods because they are compelled to consume home produce, of which their consumption, however, does not much exceed that which we have found to be the outlay of the Austrians. The following value of the French manufactures is taken from Mr. McCulloch's Dictionary, who states that it is more moderate than most of such statements, which are generally apt to be exaggerated.

The value of Cotton goods was	£9,000,000
,, Woollen ,, ...	10,600,000
,, Linen ,, ...	10,400,000
,, Silk ,, ...	12,000,000
	£42,000,000

The United Kingdom with a population of 27,000,000, produced goods to the value of £125,000,000, while France, with 34,000,000 of inhabitants, produced only £42,000,000 of the same kinds. The proportion of goods consumed per head in France would be as follows:—

	£	s.	d.
Cotton goods	0	5	3
Woollen and worsted ...	0	6	3
Linen, &c.	0	6	1
Silk	0	7	0
	£1	4	7

It is not, perhaps, necessary to pursue these comparisons further. As far as they go, they prove that in our cotton factories is embarked more than one half of the capital embarked in similar establishments in the whole world. They prove that the industrious populations of Austria and France produce in comparison only one-fifth, and one-third of the quantity of cotton goods produced at home, or if allowance be made for the difference of the population of the three countries, Austria produces only one-sixth, and France one-fourth of the cotton produced in this country. They prove that our population can afford twice and three times the amount of clothing indulged in by the Austrians and French, and they prove also, that while we not only clothe ourselves with comparative luxury, we send to every part of the globe, and we will send to them if they will admit them, as many of our moderately priced comforts and luxuries of clothing as they may require, and thus we may help to raise the comforts of our neighbours to a degree of equality with our own.

ADVANTAGES OF THE UNITED KINGDOM AS A MANUFACTURING COUNTRY.

The rapid extension of manufacturing by motive machinery in this country, gave to manufacturers a start in the race of commerce which has been held for some time. The power to import English machinery, and the vigour of our manufacturers, have not been thrown away upon foreign manufacturers. We see the factory system developing itself more and more abroad. The hand-loom is being supplanted by the power-loom, and each country has exhibited a desire to supply their own looms with native spun yarn. Hence has arisen an anxiety among manufacturers that the universality of our commerce is threatened with a serious inroad, and it has been stated that foreign goods have been exhibited in this country at a price which it is considered will affect the prices of similar goods manufactured in England. I believe, however, that none but an occasional inroad upon our supremacy as manufacturers need be apprehended. In the first place, it is not probable that the number of working hours in this country will be reduced below their maximum at the present time, viz., sixty hours per week. Now, in all foreign countries there is a continual pressure for the reduction of their long hours of work. In Prussia there is a factory act, for limiting the hours of labour, partially in operation, which will doubtless be pressed on as the manufacturers become accustomed to its restrictions. In France, there is a Factory Act, which could be put in force at any moment by the Government, although it is actually in operation only in the Department du Nord. In Austria, Belgium, Saxony, &c., there are some general laws affecting the education of children when employed in factories, but practically the hours of labour are unlimited. In Russia, I believe the government is contemplating the introduction of factory regulations.

I go as far as any one can do in relying upon the principle of non-intervention, whether of politics or of trade. I agree that to limit the hours of labour is an interference with rights, which nothing but an overwhelming necessity can justify; and herein do I think that the interference in factories is clearly justifiable. It has been said, and we know how true it is, that God tempers the wind to the shorn lamb, and in a like spirit has the Creator ordained seasons and changes which temper the hardships of life to him whose daily bread is earned by the sweat of his brow. No one has ever proposed to lessen the hours of labour of the agriculturist—no one has, upon medical or sanitary grounds, ever proposed to restrict the hours of labour of men pursuing mechanical employments in the open air, because Nature herself has provided changes of season and varieties of temperature—the inexorable laws of nature, which do, in fact, relieve and shorten the labours of the workman in fields, upon stone, iron, and the like. He may labour long in the warm sun; moreover, he may earn more than he requires for his daily wants, but that labour cannot be continued throughout the year; the cold and the early night of winter stay his plodding hand; his work commences at a deferred hour and ceases early; his frame has the opportunity of becoming invigorated and fitted for the coming toil of the ensuing summer; but not so the "factory hands;" their daily work depended not upon the light of the sun, or the warmth of its rays—their labour was not limited to the sun rising and sun setting of winter. That light which, as we are told by the philosophers, was imbibed from the sun, and has been for ages undergoing hidden chemical changes in the bosom of the earth, is now, by the application of heat, released from its bondage, and illumines the dim hours of night and diffuses the warmth of the day. Hence, light and warmth, denied to us by nature in winter, are generated within the walls of a factory by art, and the factory hands, bound to their iron master which requires constant and unremitting attention, did, with tired fingers and toiling steps, follow each revolving thread, until the power ceased to revolve; and the master, having at his command light and warmth, became independent of the fading light of the sun, or the chill pinching of the air, for he could supply light and warmth day and night throughout the year.

Without the passing by the legislature of a penal enactment for restricting the labour of children, young persons, and women to a healthy duration, it would have been impossible for manufacturers to have lessened, by voluntary agreement, the hours of work of their establishments. Most of us are actuated by the best intentions, but we cannot always be just unless we know that our neighbour is so likewise, and that if he attempt to diverge from an honourable course, he will be compelled to retrace his steps.

With much that there may be to deplore in the present condition of the working classes, and with much that may need amendment—this meed of praise cannot be denied to them, that they have not abused the opportunities which the factory regulations have secured to them. Politically, morally, and socially, the manufacturing districts are daily and hourly advancing. No one who mingles with the workers in factories, whether of textile fabrics or metals, can fail to observe the intelligence of a large number and the well-informed minds of many, and to those who, like myself, labour in their midst and for their welfare, it is no slight happiness to be able to feel this, and to mark that their social and moral progress is sure, although it may be gradual, and that manufacturers themselves approve the law, support the administration of it, and bear witness to its efficiency in having banished many evils which formerly abounded in the factory districts.

Thus, in England, we have already restricted the hours of work to a moderate and generally approved limit, while in no foreign country has a general law been applied, although in some, manufacturers are being prepared for factory regulations, and in others, doubtless, they will be introduced at no distant period.

Again, turning to the difference in character between the British and foreign artisan, there is a clear and marked difference in their mode of working. The Englishman steady, active, persevering, and attentive to his work, keeping pace with improvements, adapting himself readily to altered circumstances, seconding the increasing exertions of the iron man, not overworked by an English factory day, 10½ hours, answers to all the exertion that is demanded of him by increased speed or varied processes in a factory. While his foreign competitor, already fatigued by his 12 or 14 hours of daily work, is not in a condition, if he had the natural disposition, to expend an increased amount of daily exertion upon more complicated machinery, or by reason of increased speed of spindles and shuttles; he is less active, less attentive, and less steady in his work than the English operative. In 1853, after a visit to some of the chief manufacturing establishments in Prussia, I stated the result of my observations as follows:—

"Comparing the amount of work that can be turned out by an English operative, the skill and intelligence with which he performs his work, and his capability of adapting himself readily to mechanical improvements, it was admitted by every manufacturer to whom I spoke upon the subject that with the sole advantage of cheapness of labour they could not compete with English manufacturers, and they feared the recent restrictions of labour in Prussia would affect the power of production, for the Prussian factory operative labours at least ten hours per week more than his English competitor, and if employed at the loom in his own house his labour is not restricted even to those additional hours."

And again, in 1855, after visiting some of the French establishments at Rheims, Rouen, Lille, Roubaix, &c., I was satisfied that Englishmen and English factories had nothing to fear in comparison with our neighbours, and to draw the comparison closer, which I am able to do by referring to the details of some large cotton spinning mills, both in this country and abroad, I find that in the largest spinning factories in Austria the proportion of persons employed to spindles has not reached so high as one person to 90 spindles, except in one case, viz., a factory in Bohemia, containing one machine numbering 144 spindles, minded by one man.

In Bavaria, the cotton spinning trade is of recent introduction, and the factories are described as well built and containing excellent machinery; yet I find, in two of the principal establishments, one of 95,000 spindles, and 1,200 hands, the other of 46,000 spindles, and 600 hands, that the proportion of persons employed to spindles is in one case 1 to 90, in the other, 1 to 80.

That I have not overrated the superiority of the English operative, as a workman capable of getting through his work in a manner very much superior to the foreign artisan, I may refer to the table of the number of spindles and of persons employed in foreign cotton manufactories. The comparison which I propose to make is perhaps not strictly accurate as representing what an English spinner can do, and what a foreigner can perform, but it is generally correct as showing the number of spindles compared with the number of persons in the same factory. The average is as follows:

In France	one person to	14	spindles
Russia	,,	28	,,
Prussia	,,	37	,,
Bavaria	,,	46	,,
Austria	,,	49	,,
Belgium	,,	50	,,
Saxony	,,	50	,,
Switzerland	,,	55	,,
The Small States of Germany		55	,,
In the United Kingdom		74	,,

But referring to the principal cotton spinning factories of my own district, I find that the proportion in the cotton spinning factories of Lancashire, in 1856, was 1 person to 180 spindles. This does not mean that one person was employed in minding only 180 spindles, but that the proportion of persons of all classes in the whole of the spinning factories in Lancashire was 1 in 180. I do not know the size of the spinning mules abroad, but in this country it is not uncommon for a man and two assistants to mind 2,200 and 2,400 spindles. Contrast the painful efforts of the old spinner, laboriously turning his wheel with one hand, and with the other producing the solitary thread, with the three well-paid operatives, producing 2,400 threads at once, and turning off daily 220 lbs. of yarn, measuring 400 miles in length.

Then as regards the raw material, I believe the advantage will always remain with this country, from our superiority as merchant carriers, from the command of capital for improvements in the transport of produce, and from the immense quantity consumed in this country, which will give our market the preference.

It is generally believed that the capital required for the building, plant, and working of a factory in this country, is considerably more than would be required abroad. I am not able to offer an opinion upon this point. The sum required for the erection and machinery of a cotton factory has been so variously estimated, that it is difficult to arrive at a correct result. It has been usual to calculate the expense at so much per spindle; and this estimate varies from 13s. 6d. to 26s. 6d. per spindle; but in Austria it is stated that the average estimate is 12 florins, or £1 per spindle; and in Bavaria, the estimate of the two factories to which I have already referred, more than £1 per spindle; but I am firmly persuaded that our freedom from fiscal and police restraints gives so great an advantage to our manufacturers as to compensate for a greater outlay of capital in buildings and machinery.

The Highest Qualities attainable by British Manufacturers.

It has often been urged, rather as a slur upon the manufacturers of this country, that whether in textile fabrics, metal, clay, or other work, we fail in the colour, form, and taste of our productions; that the porcelains of Dresden and Sèvres are the productions of nations of high artistic intelligence; that the silks and cambrics of France exhibit the highest appreciation of colour and texture; that the muslins and shawls of India are unapproached in beauty by the choicest specimens of our looms, and our inferiority is denounced as a discredit to us. But let us consider for a moment. The porcelain of Sèvres, the silks and cambrics of France, do exhibit some of the most beautiful qualities which are sought in such articles: but what called them forth? The aristocracy of France, the courtiers of the Henrys and of the Louis, revelling in all the luxuries that wealth, wrung from the middle and lower classes, could bring, demanded beauty of form, excellence in colour and delicacy in texture. We know that the sturdy burghers of the Low Countries wrought out for themselves some freedom of action and thought, and procured for their guilds some portion of political influence, and they produced, not only luxuries for the wealthy and powerful, but plainer wares for the middle classes, for the humble and poor. In France there was no such middle class to push onward and to force upon those above them a recognition of their position and influence. All power was in the hands of an aristocracy and of a court of exclusive *régime*, whose will, whose whims, whose tastes led the sentiment of the country. The gratification of their wishes was the highest object to be attained by the trader, the greatest emolument was to be obtained by producing the most exquisite wares for the admiration of the great. We see this exemplified in a marvellous degree in the pottery of the countries which boast, and honourably so, of the beautiful and elaborate productions of Dresden and Sèvres. The earthenware in use for domestic purposes is of the commonest and meanest kind; it is coarse in material, ugly in shape, heavy and unpleasant to be used. Compare with it the common pottery in England, which is cheap, handy in make, and very frequently good in design and colour. In this country the aim of manufacturers has been to produce wares for the middle classes, good and reasonable in price, and they have succeeded. That they can also send from their workshops productions scarcely inferior to those of Dresden and Sèvres, the names of Minton, of Copeland, and of others will testify. Let us take as another extreme case the muslins of India. The beauty, softness, and delicacy of these fabrics have long been celebrated. We are accustomed to think of them with wonder, and to despise somewhat their coarser but cheaper rivals of Manchester and Glasgow. But these exquisite productions have been created in satisfaction of the law of supply and demand. The rajahs and princes of India, swathed in riches and steeped in luxurious pleasures, require in their enervating climate the softest and most delicate tissues for themselves as well as for their Zenana. The use of the very finest muslins was restricted to members of a royal house. In a country which contained two prominent classes — princes and peasants—the former would naturally prevail, and we find throughout India that there has been a demand for the choicest and most beautiful specimens of manufacturing art, for the gratification of the powerful and the rich. The chief thought of the dependent has been to produce the most luxurious and most exquisite fabric for the prince and his favourites. The intelligence and dexterity of the spinner and weaver are taxed to the utmost stretch to supply their wish or to anticipate their wants, and the reward was frequently as lavish as it was generous; and in proof of the estimation in which the art of weaving was held, I may mention that the Hindoo weaver ranked above all other mechanics, and next below the scribe. The delicacy and fineness of the Dacca muslins are not easy to describe. In the imaginative language of the East, they have been called "webs of woven wind;" and it has been stated that when laid upon the grass to be bleached, and the dew is upon it, it cannot be discerned. That this latter description is not overdrawn, we may gather from a circumstance which is related to have taken place at the court of Arungzebe. He is said to have chidden his daughter for appearing before him too thinly clad, when she replied to him that she was clothed in nine folds of raiment. She might have added that her garment contained a filament of cotton which, if produced would measure upwards of forty miles. And a Persian ambassador, upon returning from India to his own country, is said to have presented his Sovereign with a cocoa-nut containing a piece of India muslin for a turban 30 yards in length, which, when expanded in the air, could hardly be felt.

These appear to be marvels, but I believe them to be honestly true. Reckoning the dress of the daughter of Arungzebe as containing 20 square yards, and that four miles of yarn could be spun by an expert spinner in India from 180 grains of cotton, her dress would weigh about four ounces, and contain forty miles of yarn; and then, calculating according to the English method of determining the fineness, or, as it is technically called, the counts, or numbers, of yarn, by reckoning so many hanks or skeins, of 840 yards each skein, to a lb. weight, it would appear that her dress was made of about 320's, *i.e.*, 320 hanks of cotton yarn, each measuring 840 yards = 160 miles of yarn, which would weigh 1lb. But to spin 300's is no marvel in this country; 700's are constantly spun for the manufacture of lace, *i.e.*, a pound of yarn of that degree of fineness will measure upwards of 334 miles in length. The Messrs. Thos. Houldsworth and Co., of Manchester, who, I believe, spin the finest yarn in this country, spun for the Great Exhibition of 1851 specimens in short lengths of 2,150's = 1,026 miles to the pound weight, and the estimate is that the fibre of the raw cotton from which this yarn was spun would average 8,000's, *i.e.*, it would require 8,000 hanks of a single fibre of the raw cotton, each hank measuring 840 yards, to weigh one pound. It may be true that the delicate fingers and sensitive organism of the Hindoo girl may enable her to manipulate the fibre of the cotton in spinning, with a certain degree of elasticity of which the spinning machine is incapable, but in the one quality of degree of fineness, we compete successfully with the Hindoo. And in weaving with the hand-thrown shuttle, the Hindoo weaver may, by practice, give to his muslin some qualities not at present attained by the power loom, but muslins were exhibited at the Great Exhibition of 1851 of No. 540's yarn; and I believe yarn of No. 700, spun by Messrs. Houldsworth, has been woven into a dress for Her Majesty, and these are proofs of our progress also in the art of weaving in competition with the Indian loom. Had the demand existed in this country of sudden changes of temperature, for muslins of almost super-human fineness of texture, could it be doubted but that the demand would have been supplied by our energetic and highly intelligent manufacturers, and that such goods would have obtained a preference in the markets of the world. As I said before, our manufacturers supply that which is most in demand. The reigning favourite of Delhi or of Oude may sigh for a robe made of the "web of the woven wind," but in this country the thrifty housekeeper, whose name is Legion, demands Horrock's long cloth for shirting, Irish union for sheeting, and Scotch cambric for economic use.

Economy of Material and Improved Processes.

Within a very few years the economy of the factory has been greatly improved in this country. There are the improvements in machinery, the whole of which have for their object the substitution of the iron frame for the human hand. There is increasing economy in the use of materials, the utilisation of waste substances, and the re-manufacture of old materials. The breaking up of existing machinery, and the substitution of new, is a marked feature in the present era of manufactures. I scarcely spend a day among the cotton factories of Lancashire that I do not find in one or more either lengthening of spinning machines, re-distribution of preparatory processes, or introduction of new machinery. At one of my recent visits to a cotton factory the intelligent proprietor referred to a room in which he had had new machinery within the last two years, and he was about to replace it with new, which would require one hand less to tend it and would produce one-fourth more work. The cost of the alteration would be covered in less than a year. A remarkable instance of the economy of labour is to be found in the substitution of cylinder-printing of calicoes, &c., for block-printing, by which one man and one boy do the work of one hundred men and one hundred boys; and this mode of printing has been brought to such perfection that ten colours can now be printed at once. Another instance of the remarkable advance of improvement came under my notice still more recently. Some new machinery was pointed out to me in a newly-built factory, of such remarkable self-acting power that I have obtained from the proprietor the following particulars in respect to it:—

The process is for preparing wool up to the spinning.

The plan in general use a few years since, for the same amount of work as performed by the new machinery, required the following hands:—

18 men.
45 young persons or women.
63

The proprietor then introduced a better plan, which required—

18 men.
15 young persons or women.
33

The last improvements enable him to dispense with more than one-half of the above number, and chiefly those receiving the higher wages. He employs in his new mill:—

4 men and
9 young persons or women.
——
13
——

But with this new preparatory machinery he has put up improved spinning machines, and here, again, he dispenses with the labour of six men, and nine young persons and women, out of 44 persons, so that instead of employing 33 men and 74 young persons and women, he only employs 13 men and 29 women and young persons. These improvements have been chiefly caused by the scarcity of labour. The woollen hand-loom, of which there has been a large number, is being rapidly replaced by the power-loom, and chiefly because of the diminished quantity of adult male labour; and in the cotton districts there has been for some time a considerable deficiency, and we may look for continued improvements in manufacturing processes, which will be necessary to meet the increasing demand for textile fabrics, but these innovations are not always against the interest of the operative. If a manufacturer cannot find hands sufficient for his factory, and I know many whose complement is never filled, they must replace, if possible, their old machinery with that which performs more work with less human aid, and it does not follow that the price of human labour is diminished as a consequence of these alterations, for we have seen at Nottingham, especially, where the old stocking frames have been succeeded by what are called roundabouts, and rotary frames moved by steam-power, that the stocking weaver is able to earn very considerably more at these new frames, which have reduced the price of at least one half of certain classes of hosiery, than he could at the old stocking frame.

There is, doubtless, greater care in the use of the various substances requisite in the operations of a factory than formerly, but there is still room for greater economy. For instance, the consumption of grease and oil is no small item in the current expenses of a factory, but it has been used with a careless waste, covering the floors with grease, which accumulates, and the dirt sometimes forms a thick uneven crust over the whole factory; but the use of self-feeding apparatus, and of cans for delivering the exact quantity of oil required by each spindle and wheel, has tended greatly to economise the use of an expensive material, and to render the rooms clean and healthy. I am assured that a saving of one-fifth of oil might be effected by a careful lubrication of the machinery. The adoption of cleanliness, and of improved methods of ventilation, I conceive to be most important elements in the economic use of the material "man." A well ventilated room, clean floors, as well as walls, and proper change of air, will enable a man to work with more vigour and attention than if he were confined in a room, close, ill-ventilated, and reeking of grease and dust.

There are several factories in my district in which all these improvements have been carried out in a liberal and discriminating spirit. I can bear testimony to the cheerful and healthy condition of the persons employed, while I am assured by the proprietors that in promoting all these plans for the physical amelioration and comfort of their hands, they consider as manufacturers that their work is better and more expeditiously done.

It has been well said by Lord Palmerston, that dirt is only to be condemned when it is in the wrong place. Now, a factory is certainly not the place for the accumulation of dirt, nor is the stream which flows in its vicinity the proper place for its reception. All offensive and dirty matters used to be freely discharged into the nearest stream, but now the dirty and greasy washings of factories, and herein I allude chiefly to woollen and worsted factories, are conducted to a tank, and by a very simple process the watery particles are discharged, and the residuum is reconverted into a fatty substance, largely used for candles and the manufacture of soap. In one establishment alone I am assured that a profit of £800 a year, after paying a rent of £200 to some neighbouring factories for their refuse, is made by this conversion to useful purposes of the dirt which formerly polluted the stream and neighbourhood.

It has been found that old materials form very good substitutes for new. The bits of raw cotton which do not pass through the machines, the ends of rovings and yarn, the flaws, which are broken off, are all carefully preserved, and undergo several modes of preparation by which they become serviceable for various purposes. It is the same with wool, with flax and with silk—but the chief utilisation of old materials is in the manufacture of new coats out of old. A Polish Jew, or an Italian beggar, is generally considered one of the dirtiest objects with which we can come in contact, yet it is not impossible that some of us may, at this moment, happily unconscious of our fate, be wearing some portion of the cast-off habiliments of a Polish Jew. Coats, trowsers, &c., after having been well worn in this country are shipped off for the German ports, and after having been distributed where most in request, and thoroughly used up as garments, they return to us as woollen rags. They are sorted into qualities, and they then go through a machine called a devil, which tears up the bits of cloth and delivers them out as wool, which undergoes again the various processes of carding, spinning, &c., and being mixed with new wool, again becomes cloth.

It is calculated that at least 45,000,000 lbs. of woollen rags are annually consumed, which is about one-fifth of the whole of the material, new or old, now used in the manufacture of woollen cloth. Twenty-five years ago the price of the best woollen rags averaged about £4 4s. per ton, but the present demand for them has raised that price to £44 per ton. When these rags were first introduced, and for some years afterwards, they were only of use if they contained nothing but wool originally. But the demand became so pressing, that the rags of fabrics made of cotton and wool, and of cotton and worsted, are no longer rejected. They undergo a process called "extraction," by which the cotton is destroyed, and the woollen fibre is preserved and utilised. Although rags are very generally used in woollen factories, they are principally manufactured at Dewsbury, Batley, and the neighbourhood near Leeds, in which it is estimated that from 7,000,000 to 8,000,000 of yards of cloth are annually manufactured, of the value of £1,500,000.

Conclusion.

I have thus endeavoured, but I feel with indifferent success, to point out a few of the incidents in the manufacturing of textile fabrics in this country. It may be truly said that we clothe the whole world, for we export annually, of calico and woven cotton goods alone, sufficient to make an under garment for every man, woman, and child in the universe. The cotton yarn annually spun in this country, reckoning it to be of an average size, would reach 600,000 times round the earth, and our looms produce annually 3,000,000,000 of yards of calico.

The cotton factories contain one-half of the cotton spindles of the rest of the world, and can produce cotton better and cheaper than in any other country. They spin daily 50,000,000 of miles of yarn, from which our looms weave daily 10,000,000 yards of calico or other goods.

Can it be wondered at that there is a party of politicians called the "Manchester School." It is common for us to condemn those who seek to maintain class interests, but do not all endeavour to support their own class? the army and navy—landowners—coal-owners—ironmasters, all keep their own interests before them. The manufacturers do the same. They have wealth, they have intelligence, and the 6,000 or 7,000 masters have the responsibility of being in the aggregate the mainstay of nearly one-fifth of the population of the country. Let it be considered to what infinite ramifications the effects of short time are felt, and felt most by those who receive the lowest rate of remuneration, and who are the least provident of all, and the weight of the responsibility of these manufacturers will be seen to be no light one, and fairly may they maintain, with no selfish views, that it is the duty of a government to secure "the greatest amount of happiness for the greatest number."

DISCUSSION.

The CHAIRMAN would now invite discussion upon a paper which he was sure they would agree possessed no common interest, and was marked by no common ability. The history of the factory system of Great Britain included probably a larger number of elements of interest and importance than could be compressed into any one subject brought before a public audience. Its growth, its present extent, its influence upon the social condition of the people, and on the wealth and power of the State, all rendered it a subject of the utmost importance to Englishmen. He thought Mr. Redgrave had introduced this important topic in a spirit which must be highly approved of; there had been nothing of exaggeration and nothing of depreciation. He specially desired to express his obligations to Mr. Redgrave for having done justice to the intelligence of the working classes of this country. We were sometimes disposed to estimate higher than they deserved the qualities of the artisans of other countries, and it was satisfactory to be assured, from the distinct and definite data which Mr. Redgrave had brought before them, that in every point of comparison the artisan of Great Britain contrasted favourably with the artisan of every other country. He would now invite his friends around him to add to the interest of the paper by discussing those questions which it fairly opened. He had the pleasure of seeing present a gentleman who had been the historian of the cotton manufactures of Great Britain and of the varied interests which were involved in them, and he hoped that gentleman would do them the favour of contributing to the interest of the discussion by some observations.

Mr. E. BAINES, M.P., said he had listened with pleasure to the very interesting paper of Mr. Redgrave. It was a great advantage to have gentlemen like Mr. Redgrave in the situation which he filled, with their eyes open to all that was passing before them in this country, and ready to collect information from other countries and compare it with the state of things in our own. As far as he (Mr. Baines) was able to judge, there had been no exaggeration or depreciation in his paper. He had himself taken some pains with the statistics of the cotton and woollen manufactures at different times, and he generally agreed with Mr. Redgrave's results, only that gentleman had brought down his information to a more recent date—at least with regard to the cotton manufactures—than he (Mr. Baines) had done. It seemed to him that the facts stated by Mr. Redgrave might be implicitly relied upon, and it was not a common thing to have statistics of a very complicated subject brought out without exaggeration or error. He believed these statistics were as correct as anything that could be had at the present day. There was one observation he might make with regard to the way in which cotton was extending itself into all other textile manufactures and mixing with them. Formerly, the opinion prevailed very generally in this country that cotton, being a comparatively cheap commodity, its introduction into other fabrics was injurious to their quality; but now cotton was indispensable to our woollen and worsted manufactures, and, to a considerable extent, to our silk and linen manufactures. It was introduced to an enormous extent both in the worsted and woollen trades. The manufactures of Bradford were founded very much upon the mixture of cotton with worsted. Thus were made light and beautiful fabrics, different from the old heavy worsted materials. Cotton was now introduced in a variety of ways, amongst others into the mousselines-de-laine, and when used with a certain quantity of worsted was found to produce a valuable fabric. It was the same with regard to woollen goods. He recollected the time when woollen cloth, with cotton warp, was regarded as the most wretched thing in the world. Now it was found that cotton, when combined with an article called shoddy or mungo, produced the very thing that was wanted, and they had two cheap materials which by their combination made very respectable cloth. The shoddy was produced by tearing up old clothing and working it over again, but the fibre was so short that cloth made of shoddy alone was not strong, and was almost worthless, but by the introduction of cotton warp, which was peculiarly strong, with this material, which was light and warm, they produced a cheap and most serviceable article. This was illustrative of the remark of Mr. Redgrave, that England manufactured for the million, and not for a few aristocratic families or classes. The several textile manufactures of this country had encreased at a most enormous rate between the years 1838 and 1856. Mr. Redgrave had given them the particulars of the latter year. He (Mr. Baines) had before him a paper which he prepared for the British Association, relative to the woollen manufactures between the years 1838 and 1856—a period of eighteen years; and it was interesting to observe the wonderful rapidity of their progress. The various manufactures in cotton wool, worsted, and silk employed, in 1838, 423,000 persons, while in 1856, the number was 682,000. These were in the factories alone. The horse-power employed had increased from 102,000 in 1838 to 161,000 in 1856. The number of power-looms in operation in 1838 was 115,000 and in 1856, 369,000. Cotton had the immense advantage of cheapness. It was to be hoped it would retain that advantage, and that we should not be deprived of our great supply of that important raw material by the events that were happening in other countries. It was of unspeakable value to have a raw material which was so cheap. If they compared the price of that material with that of our home product, namely, wool, it would be seen to account, in a great measure, for the rapid growth of our cotton manufactures. The price of cotton two years ago was, upon an average, 5¾d. per lb., whilst the price of wool was 1s. 4d. Flax was about 5d., or nearly the price of cotton, showing that the raw material of wool was three times the price of cotton, and whether it was English or foreign wool, the price of each was nearly the same. England was furnished with only one native raw material to any great extent; flax was only grown to a small extent. The growth of the raw material of wool was large. It was the old growth of the country, and as such it had been for a long period of years the subject of legislative enactment in the prohibition of the export of that article. He estimated the quantity of English wool produced at the present time at 175,000,000 lbs. per annum, whilst of foreign wool—from Australia and other colonies—the quantity amounted to about 140,000,000 lbs., of which a certain quantity was exported, so that we might be said to consume about 100,000,000 lbs. of foreign wool, and 160,000,000 lbs. of home-grown wool per annum. The increase of our woollen manufactures had been slower than that of the other manufactures. Cotton, worsted, flax, and silk, had all increased at a more rapid rate than the manufactures of wool. The reason for this, he believed, was not generally understood. The chief causes were—in the first place, the dearness of the raw material; and in the next place, it was the fact that wool could not be worked in factories by machinery so well as the other materials. In most other descriptions of manufactures the thread was spun rather hard, but it was not so with wool. This must be spun soft and loose, and thus it was a soft and feeble thread, which could not be so easily worked in power-looms, owing to the immense rapidity and consequent friction of the shuttle. It was the only material which "felted." It had that peculiar fibre which contracted upon the application of moisture and warmth, and the fibres became interlaced and firmly united, so that a piece of cloth of sixty yards in length, when milled, would come out forty yards, whilst the width would be reduced by that process from nine feet to about four and a-half feet. That was what was called the felting process, and in order to allow of the felting, the material must be spun soft, and not as a hard yarn, like that produced in the factories of Manchester, or the hard worsted yarn which was spun in Bradford. It followed, therefore, that they could not subject this yarn to the power-loom to the same extent as they could the other descriptions of yarn. It must be, moreover, worked up for the most part by men and not by women and children. Hence the proportion of men employed in the woollen manufactures was larger than in every other textile manufacture. He quite agreed with Mr. Redgrave in the high opinion he had expressed of the efficiency of the English workman. There was an official inquiry made in France, about the year 1831, with regard to the relative position of the French and English manufacturers at that time; and the French manufacturers generally gave this opinion: they said the English workman possessed a combination of qualities not possessed by the workman of any other country. He had the combined qualities of the Norman and the Anglo-Saxon races—the activity and energy of the first, and the plodding perseverance of the other, and it was this combination of qualities in the English workman which made him superior in these manufactures to the workman of any other country. But he was not sure whether our descendants on the other side of the Atlantic did not excel us in these respects; for whilst it was the practice in Lancashire to have two power-looms under the charge of one girl, he had heard that in Massachusetts one girl had the charge of five or six looms. With regard to the question of taste in design, he to some extent concurred with Mr. Redgrave in his observations upon that point, for we in England had much to do yet in that direction. The contrast between the English and foreign portions of the Exhibition of 1851, and also of the Paris Exhibition in 1855, was very great in that respect, especially in the method of arranging the articles in the latter. It was distressing to see the melancholy appearance of the Leeds and Yorkshire goods in comparison with those of many parts of France. The arrangement and the mode in which the French goods were draped was very beautiful, whilst the Yorkshire goods were hung like towels over a rail. He hoped the Society of Arts, which had so nobly originated the approaching Exhibition in 1862, an event he anticipated with very great interest, would endeavour to give a stimulus to the improvement of our people in their taste and mode of arrangement. He would only add that he felt much indebted to the gentlemen connected with the Society of Arts for the determination with which they had pursued the great object of another exhibition. He was sure the last Great Exhibition was of immense advantage to us in respect of taste, and he anticipated admirable results in that direction from the Exhibition of 1862.

Mr. BAZLEY, M.P., like his hon. friend who had just addressed them, had great pleasure in bearing his testimony to the excellence of the paper they had heard that evening, in which the merits of the textile manufactures of the United Kingdom had been so ably dwelt upon. Well acquainted as he was with the general statistics of such trades, he confessed he was agreeably surprised by the valuable combination of facts which had been laid before them. He observed that Mr. Redgrave had spoken of the four great originators of the cotton industry of this country—Arkwright, Strutt, Hargreaves, and Crompton. Having been acquainted, when a boy, with Crompton, he begged to state that he had no hesitation in awarding to him the merit of the invention of the mule which had effected so great a revolution in our textile manufactures. He did not know a better authority upon the subject of our textile fabrics than his friend Mr. Baines, whose History of the Cotton Trade in this country had afforded such valuable information to the whole industrial community. He wished Mr. Redgrave had been in a position to have given them an estimate of the value and extent of the various textile industries at the present moment. His records only extended to a period of five years since, when, unquestionably, we had a most extensive trade in those branches of industry; but in the cotton trade, with which he was principally acquainted, he might without hesitation assert that the augmentation had not been less than twenty per cent. in extent and value during that period; indeed, he thought manufacturers had, in some instances, increased their productions to a dangerous extent, and such as they could not hope to maintain; for he could show that in some branches of textile industry the increase had been at the rate of ten per cent. per annum; which was confirmed, not only by the increased consumption of cotton during he last few years, but also from the information he had derived from engineers and machinists, and when they heard that at the present time there were 20,000,000 of spindles at work, there might be an apprehension in the minds of some persons, that the increase was growing beyond the legitimate demand. The paper they had been favoured with was replete with matters of interest, and was almost above all criticism; but in estimating the increase of our manufactures during the period he referred to, he should say, instead of the maximum extent of our textile manufactures being £125,000,000, they did not amount to less than £150,000,000 at the present time; and it was to be recollected that this great increase of production was not a question of mere money value, but was also an indication of the increased comforts enjoyed by the great family of mankind. There were consumed last year, 1,000 billions of lbs. of cotton. The great varieties of manufactures into which that article entered, he could not attempt to describe. The fancy goods in which cotton was combined were too numerous to mention. There was one interesting fact, worthy of notice in connection with the profitable disposal of the waste of the cotton factories, which was formerly thrown away. At least 75 per cent. of the superior descriptions of paper was made from the waste of the cotton mills, which was collected and carried away daily. When these large quantities of oily substances were allowed to accumulate in the factories, as was formerly the case, there was great danger of fire from spontaneous combustion, and fires were formerly far more frequent. Cotton was known to be a great element, not only of comfort but of health. Its absorbent qualities were greater than those of linen, and cotton shirting and sheeting were very rapidly displacing the linen fabrics. He did not wish to see any rivalry between the two manufactures, but there could be no doubt that the growing intelligence of the people would surmount all prejudices, and cotton would be more largely consumed than ever. It was his wish to look encouragingly upon the supply of the raw material. His friend Mr. Baines had alluded to the embarrassments that might arise from the present state of feeling in America. The United States had lost their unity; they were now severed. Whether there would be any displacement of the industry of that country, and whether at the moment we required an increase we might be left with a diminished supply of cotton, was an event which experience alone could determine; but he would say that it was far from desirable that our main supply of so important a commodity should depend chiefly upon one source, and this was far from creditable to the enterprise and energy of a country possessing such a colonial empire as England boasted of. We had received this year no less than 85 per cent. of our raw material of cotton from the United States of America; eight per cent. from other foreign sources; and only seven per cent. had been received from the British colonies. No less than 85 per cent. of the supply was derived from coerced and oppressed labour, which they would like to see as free as their own. It was a remarkable fact that our colonial possessions contained a greater extent of land capable of supplying this material than any other countries upon the face of the earth. Indeed, the amount of land required was not considerable, as a region equal in extent to Yorkshire would alone supply the cotton we required if the climate were suitable. A short time ago he received a communication from Sir Charles Bowen, Governor of Queensland, Australia, in which he stated that there was in that district land, exceeding the area of the whole of France, capable of producing beautiful cotton, that area being not less than from sixty to seventy millions of acres, whilst Yorkshire contained only about four millions. From that colony they had already received cotton of the most excellent quality, and of a fibre superior to that grown in America. Then again, a wide field for the growth of cotton was presented in our East Indian possessions. At the Exhibition of 1851, Mr. Houldsworth and himself were permitted to examine some of the samples of East Indian cotton, and at the same time some of the muslin of that country was placed before them. As had been stated by Mr. Redgrave, that fabric had been made from about No. 320-yarn; but both Mr. Houldsworth and himself had spun much finer than that. Six or seven years ago he was able to buy a few bags of very fine Australian cotton in Liverpool, and he found the quality was so beautiful and so admirably adapted for the production of exceedingly fine yarn, that he spun some No. 600-yarn from it, which was only about half the thickness of the fabulously fine yarn of India. It was, in fact, so fine, that the weavers of Paisley could not work it. He therefore sent it to a correspondent in Calcutta, by whom it was forwarded to Dacca, where it was woven, and it was sent back to him as one of the most beautiful muslins he had ever seen, and he had the pleasure of sending a contribution of that muslin to the Paris Exhibition. Reverting to the great natural resources and capabilities of India for the production of cotton, Mr. Bazley expressed his anxious desire to see the energies of his countrymen directed to that object. Some persons doubted the capabilities of India as a large cotton producing country, but there were ample evidences that it was so. He had bought Indian cotton at from 6d. to 9d. per lb.; whilst the average price of United States cotton was from 6½d. to 7d. per lb., so that it was clear they had only to get a larger supply from India to find a ready market in this country. Hitherto, the complaint with regard to the cotton from India, had been that it was not sent to market with sufficient cleanliness; that it was badly packed, and badly got up. But the truth was it was not, as a general rule, *grown* of the quality that was required, and, therefore, it was not so useful as it otherwise would be. Last year they received from India a supply of no less than 600,000 bags, or equal to a consumption of 12,000 bags weekly; but the whole consumption of Indian cotton in this country during the last year was only 3,300 bags. What became of the rest? It was shipped to various places on the continent of Europe, where it could be used with greater economy than in this country. Mr. Baines had asked the question how many power-looms were appropriated to the attendance of one person in Lancashire. He believed there were cases in which one person had charge of six looms; but four or five was the average number, and he could state that young women in Lancashire were earning as much as 20s. per week from the excellence of the work given to them. Labour on the continent being much cheaper than in England, the inferior descriptions of cotton could be worked there with greater advantage; and it had been known to be the case that workpeople here had refused to work on account of the inferiority of the material offered to them. Under these circumstances it was clear that India ought to produce better cotton, for two reasons. In the first place, because it would pay the ryots better, and in the next place, the manufacturers required a better quality, and by that means both the producer and the consumer would be mutually benefited. Mr. Bazley proceeded further to point out the advantages of India as a cotton-producing country; but the present great want of that country was the proper means of communication, for which they must look not merely to the system of railways already in progress, but to the improvement of the canals and rivers in the interior, by means of which the system of irrigation could also be very materially advanced. In conclusion, he would say he hoped the result of public attention having been called to this important subject by such a man as Mr. Redgrave, would give an impulse to national exertion which would lead to those benefits of which he (Mr. Bazley) had been the humble advocate on the present occasion.

Mr. John Dillon remarked, that having attended that evening in the capacity of a learner, his own experience being chiefly in the silk trade, he was bound to admit that the paper was one of a most instructive character. He had been struck with many of the facts presented to them by Mr. Redgrave, showing the progress of manufactures from the days of the handloom to the present time, when they furnished clothing to the people of every country in the world; and also as to the high character of the English workmen as compared with those of other countries. He sincerely joined in the wish, so well expressed by Mr. Bazley, that our energies might be employed for the more extensive production of the great staple of cotton in our own colonial possessions, which could only be called forth by the magic of British capital and enterprise, both in India and Australia. He would make one remark with reference to the gentleman who had favoured them with this paper. There might be a difference of opinion as to the interference of the government with the rights of the manufacturers, but there was one course of conduct on the part of the government of which all must approve, and of which Mr. Redgrave afforded a triumphant example, viz., the making a judicious selection of gentlemen capable of collecting information upon matters of the greatest importance, affecting the commerce of the country, and throwing light upon the progress of a great branch of our manufacturing industry. He would express in the highest terms his sense of the valuable information which Mr. Redgrave had communicated to them that evening.

Mr. P. L. Simmonds said he rose with some diffidence to address the meeting after two such competent anthorities as Mr. Baines, the representative of the woollen interests, and Mr. Bazley, the exponent of the cotton trade. But his plea for intruding was, that having recently been investigating in detail all the textile industries of the country, he might perhaps be able to add a few facts to the information which had been laid before them. Having lately had to prepare new editions of Dr. Ure's "History of the Cotton Manufactures," Ure's "Philosophy of Manufactures," and other commercial works, specially treating of the textile manufactures, he had necessarily become familiar with the extraordinary progress which had been made in all, whether in this or in foreign countries, in the last quarter of a century. The subject, however, was so comprehensive, that it would only be possible to allude to one or two commercial and statistical facts bearing upon it. Unfortunately, as Mr. Redgrave had observed, there were but very insufficient data available as to the manufacturing industries in foreign countries, to enable us to institute anything like fair comparisons. The paramount importance of the textile manufactures of this kingdom, both as regarded the social progress, comfort of the people, and extension of foreign commerce and civilisation, no one would be disposed to deny, seeing that they gave employment to one-fifth of the population, and that we had twice as many spindles at work, and (within 14,000 or 15,000) nearly as many operatives employed thereon as all the countries of the Continent of Europe. But, as had been well pointed out by Mr. Redgrave, the subsidiary employment given to many other trades should be taken into consideration, and if these could be estimated in any way, they would be found also to reach a very large sum. For instance, even in the case of skips or baskets, which had been alluded to, the aggregate cost of these must be something considerable, for he knew that in one factory the cost of the stock of skips amounted to £2,600. Highly as he appreciated the very interesting paper which had been read, he could have wished that Mr. Redgrave had brought down his statistics to a later period. The year 1856, just after the conclusion of the Russian war, was scarcely a fair criterion to judge of the progress and position of our factories, spindles, and their produce at the present time. Mr. Redgrave, from his official position, might have been able to bring down the returns of factories and spindles to a later period than four years ago, and so with the exports and home consumption, official returns existed, and data were available, from which estimates might have been framed for even the past year. In contrast with the return submitted by Mr. Redgrave for 1856, he would offer the following estimate, as a closer approximation he thought to the position of the four great textile industries at the present time, or for 1860 ;—

Textile Industry.	Estimated Value of Goods manufactured.	Declared Value of Quantity Exported.	Estimated Quantity consumed in this country. Value.
	£	£	£
Cotton......	104,000,000	52,000,000	52,000,000
Wool and Worsted	32,000,000	16,000,000	16,000,000
Flax.........	18,600,000	6,600,000	12,000,000
Silk	18,400,000	2,400,000	16,000,000
	173,000,000	77,000,000	96,000,000

Now in explanation of this table he would offer a few remarks. Firstly, with respect to cotton. The value of the manufactures consumed in this country it was difficult to arrive at. Messrs. Du Fay and Co., and other competent authorities, went so far as to estimate it a few years ago at one-third more than that exported. But he considered this too high now. Indeed it was questionable whether as much was used up here as was shipped, although there were numberless ways in which cotton was worked up, as had been already stated by Messrs. Bazley and Baines, in mixed fabrics, in paper, and for many economic purposes, which ought to be considered in the estimate. Our exports of cotton manufactures and yarn had certainly doubled in the last ten years. In 1850 we shipped £28,400,000 ; in 1855, £34,800,000 ; and in 1860, £52,000,000. The imports of raw cotton had also doubled in the same period. In 1850 we received 663½ million pounds ; in 1855, 892 million pounds, and in 1860, 1391 million pounds. Passing next to wool and worsted—for he would take these two manufactures together—the value of the trade had progressed more favourably than even Mr. Baines had stated, although it had the disadvantages of high price for raw material, and difficulties of labour, which had been so clearly pointed out. With respect to the home production of wool, Mr. Baines estimated it at 175,000,000lbs. ; he (Mr. Simmonds) calculated it at 200,000,000lbs., but these opinions were, of course, conjectural, although he had taken some pains to arrive at an approximation to the truth. The nett imports of foreign and colonial wool (less the re-exports) were, in 1850, 64,000,000lbs. ; in 1855, 70,000,000lbs. ; and in 1860, 118,000,000lbs. The imports of woollen manufactures, including yarn, &c., had been to the value of £9,000,000 in 1850, £7,700,000 in 1855 (a year of war), and £16,000,000 in 1860. He thought he was not far wrong in estimating an equal amount for home consumption in a country where warm clothing was so essentially necessary, and so generally used by all classes. He would pass next to the linen trade. There were more than 100,000 acres under culture with flax in Ireland, and at least £12,000,000 of capital employed in the trade. Our foreign supplies of flax had been declining, for in 1850 we received 1,822,918 cwts., while in each of the past years we had received less than 1½ million cwts. But there was a fibrous material brought in and largely worked up now at Dundee with flax, which ought not to be lost sight of, and that was jute, of which we imported upwards of 1,000,000 cwts. in 1859, a quadruple increase since 1853. Our exports of linen manufactures had not increased very rapidly ; the value of the shipments in 1850 and 1855, was £5,000,000, and in 1860, £6,600,000, but the bulk of this manufacture was used at home, and was fully double the value of that exported. The last textile for notice was silk ; and here, too, the principal quantity made was used at home. The value of the exports stood in the following order :—1850, £1,250,000 ; 1855, £1,524,000 ; 1860, £2,400,000. On this textile, having no other data to go upon, he was content to take the estimates of Mr. Redgrave for 1856. The total value, from the data and estimates he had submitted, showed an increase of fully 50 per cent. upon the returns submitted by Mr. Redgrave, and, even making all reasonable deductions for error, they would give, he thought, a fairer estimate of the magnitude of the trade and of the present aggregate value of the textile industries of the kingdom. There was but one other point he would touch upon, and that was the incidental mention made of the utilisation of waste substances, the collection of the blowings and droppings, the recovered grease in the wool-factories, the reconversion of old rags, and mixed fabrics, &c. These had risen into such importance that woollen rags, at one time worth only £4, now, we were told, fetched £40 per ton. He was glad to find that these secondary products were not considered beneath notice by Mr. Redgrave, since he (Mr. Simmonds) had been taken to task rather severely lately for dwelling upon them in a paper which he read before the Society. The use of these had been stigmatised as a fraud upon the consumers, and a disgrace to the manufacturers and to the country. But, in truth, the reconversion of old wool was a matter of necessity, arising from the dearth of raw material and the demand for cheap goods. The incidental mention of these, and the extent to which they were used, would at least, he hoped, have the effect of causing more attention to be given to the extended production of all the staples for textile industries so much in demand among our manufacturers, and upon which the comfort of the people, the wealth of the country, and the extension of our foreign trade, were so largely dependent.

The CHAIRMAN said it was his duty now to bring to a close proceedings which he believed had been as interesting as he was sure they must have been instructive to all who had listened to them ; and in asking them to allow him to convey their thanks to Mr. Redgrave for his paper, he would offer only one or two remarks. It had been mentioned, as a matter of regret, that Mr. Redgrave had not brought his statistics down to a more recent period ; but he (the Chairman) would ask them to remember that statistics other than those referring to this country had been brought forward. Those statistics referred to the relative amount of power and number of persons employed in these manufactures in this country and in foreign nations, and the comparisons could only be made by taking the statistics of the same period of time. If Mr. Redgrave had taken the returns of 1860, it would no doubt have been seen that Mr. Bazley was quite right in saying that there had been an increase in our exports of these manufactures to the extent of ten per cent. every year, for they found that the exports of textile fabrics in 1859 amounted to 79,000,000 as compared with about 60,000,000 in 1856. With regard to the growth of our manufacturing system, especially in cotton fabrics, it seemed to him one of the wonders of our history. Scarcely a century had elapsed since the entire annual value of our cotton manufactures was only about £200,000, and he believed our textile manufactures might now be fairly estimated at £150,000,000, and probably between £80,000,000 and £90,000,000 of that sum was due to cotton alone. And when they looked at the extent to which their social relations had been enlarged during that century of time, how there had been substituted for a merely pastoral population and cultivators of the soil a large and intelligent race of mechanics; how this had contributed to increase the wages of the labouring classes; how it had contributed to the growth of the wealth and power of the country, unparalleled in the history of any other nation—he thought they ought to have before them very frequently notices of this gigantic manufacture. He was little disposed to sympathise with those who looked despondingly upon our future supplies of cotton; and had full confidence that the energy, activity, and freedom of this country would carry us safely through all the difficulties which now threatened us. He begged to propose a cordial vote of thanks to Mr. Redgrave for his paper.

The vote of thanks having been passed,

The Secretary announced that on Wednesday evening next, the 13th inst., a paper "On the Best Method of Representing the Mineral Kingdom and Mineral Manufactures in the International Exhibition of 1862," by Professor D. T. Ansted, M.A., F.R.S., would be read.

EXHIBITION OF 1862.

The Lieutenant-Governor of New Brunswick, in his opening Speech to the Legislature, refers to a Provincial Exhibition to be held there this year, and suggests that the inquiries and arrangements connected with this Exhibition may be combined with preliminary steps for the due representation of the Province, both in natural products and articles of manufacture, at the International Exhibition of 1862.

INTERNATIONAL WEIGHTS AND MEASURES.

On Thursday evening next, the 14th instant, a Lecture will be delivered, in the Hall of the Society of Arts, Adelphi, by permission of the Council, "On the Importance to Education of the Introduction of the Metrical System of Weights and Measures," by James Yates, Esq., M.A., F.R.S. This will be the last of a Course of Four Lectures delivered in the Hall on the subject, on behalf of the International Association.

REFORM IN TEACHING THE ENGLISH LANGUAGE.

In a lecture recently delivered at the Royal Institution, by the Rev. A. J. D. D'Orsey, of Cambridge, the following suggestions were offered:—

1. Training schools for Nursery Governesses.

2. Greater care in giving National Schoolmasters a thorough knowledge of English, spoken and written.

3. Encouragement to really good men to become and to remain National masters, by rewarding distinguished veterans with School Inspectorships, instead of limiting such offices, as at present, to young clergymen and barristers.

4. The appointment, by the Committee of Council, of a Government Lecturer in each county, whose duty it should be to lecture on the principles of English teaching, and to instruct the schoolmasters.

5. The introduction of a thoroughly accomplished scholar as English Master in every great public school, not a mere educational drudge—a "general utility gentleman," to look after the "small boys"—but one of equal rank with the classical masters.

6. The endowment of at least one Professor of English in every University, his duty being to give men, during their Under-graduate career, a critical knowledge of the language—supplying deficiencies, correcting errors in speech and writing, suggesting courses of reading, drilling the future barrister and legislator in accurate and fluent oratory, and training candidates for the ministry to read distinctly and unaffectedly, and to compose and deliver sermons in a clear, impressive, and attractive style.

7. Making English take its place with Latin and Greek in every examination for degrees, as it does in the India Civil Service examinations, and giving substantial rewards (Scholarships and Fellowships) for distinction in English as for eminence in Classics and Mathematics.

8. The co-operation of the bishops in exacting from all Candidates for Holy Orders proofs of competency in reading the Church Service, composition, delivery of sermons, and extemporaneous speaking.

The speaker was perfectly aware of the objections that would be raised against such proposals, but if these, or most of these, were carried into effect, he believed the greatest benefits would result, not merely in a literary, but in a moral and religious point of view.

Home Correspondence.

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VENTILATION OF MINES.

Sir,—Our collieries were commenced in olden times, by those persons who found that mineral coal would burn and make strong fires, and who first scratched them up where the coal measures happened to crop out to the surface or nearly so. Since then our collieries have advanced to their present apparent state of perfection, enjoying all the advantages of mechanical improvement and modern science. But their beggarly origin still adheres in a sensible degree to many parts of the management and working, and they will never be entirely free from the disastrous and fatal effects of explosions and choke-damp until we shall have lost sight of the baseness of their first commencement, and such measures be adopted as may reduce the casualties of the miner to a minimum, or to those accidents which, unhappily, are inseparable from underground workings.

That noble invention, the miner's safety lamp, so valuable as a test of the presence of hydrogen, has signally failed to prevent the recurrence of explosions. The only result of its use as a "working light," has been that of enabling the miner to work in an atmosphere highly injurious to the human frame, and generally so impure that only continued use enables the men to bear it. As a working light the Davy lamp must be entirely discontinued, if only on account of the accidents and misuse to which the lamp itself is subjected, as a blow by a fragment of mineral, or the pick of the miner, is, in fiery mines, a certain cause of explosion or death.

Neither can we place any confidence in complicated rules and regulations, always very imperfectly carried out or obeyed, and which never did, nor ever will, prevent the recurrence of accidents in mines.

The miner must be allowed to work in his own way, with good air to breathe and plenty of light, free from all rules and regulations with the exception of those relating to workmanship.

This great object is only to be obtained by sinking upcast shafts, or large bore holes, in such situations as to cut the highest level underground, at which point all the foul and heated air and hydrogen would naturally accumulate. The upcast current, if sufficiently powerful, will cause the fresh air to flow from the downcast shaft, always situated at the lowest level of the mine, through every adit, level, or gallery, up to the heading where the miner is at work, by all the usual means of partitions, doors, brattices, flexible tubes, &c., and render the whole mine comfortable, safe, and healthy.

The current in the upcast shaft may be accelerated to any required degree of speed by furnace draft, fans, or other mechanical appliances, but, whatever means may be employed, (always in duplicate, to prevent the stoppage of ventilation for repairs), they should be entirely above the surface, and visible to all persons without having to go underground.

This is not the first time such a proposal has been advanced, but it has always been met with the peremptory argument, that no colliery could stand the expense of sinking extra shafts or bore holes for the sole purpose of establishing a perfect system of ventilation. Setting aside all views of humanity, this argument is worthless as a money consideration, for the produce of the miner's labour must be far more valuable when he can work with plenty of light, and good wholesome air to breathe, without the fear of being suffocated or being burnt alive, and quite unhampered by a lot of rules badly carried out and often neglected.

I entirely set aside the consideration of the cost to the public of the maintenance of thousands of widows and orphans, for though colliery owners may derive princely revenues from their mines, they never take that charge upon themselves. I am far from attributing want of human feeling, but merely state the custom.

The miner has a miserable life of it, independently of the numerous casualties he is subjected to by faults and failures of the winding machinery. The miner is cut off from the light of day for a very large portion of his life, even from early childhood, and if not killed, his years are very much curtailed from the average duration of a working man's life.

How is it that so few collieries have adopted any of the beautiful inventions, fully carried out and proved, for the prevention of accidents by the breaking of the flat rope or chain, or against the possibility of over-winding.

It is our bounden duty to alleviate the miner's manifold sufferings by every means in our power. Fortunately every means adopted to render his toil less irksome, dangerous, and unhealthy, will also tend to raise the value of mining property.

Under this system an army of overlookers, watchmen, firemen, lamp-men, and their attendants, might be dispensed with, as well as the expense of providing safety-lamps for every miner, as a few only would be required to be hung up at permanent points in order to give warning of the undue presence of hydrogen, or fire damp, so that signals could be made to the engine driver above ground to accelerate the speed of the ventilating apparatus, until danger is removed.

Under such a system the miners' candle might be almost entirely dispensed with, and the far better and cheaper mode adopted of gas illumination, partly, of course, by means of flexible tubes, but the gas-works should always be above ground.

I am, &c.,
HENRY W. REVELEY.

Poole, Feb. 26th.

MEETINGS FOR THE ENSUING WEEK.

MON. ...Medical, 8½. Mr. Thomas Bryant, "Suggestions for an improved practice in Strangulated Hernia."
Royal Geographical, 8½. 1. Consul Pemberton Hodgson, "Account of Excursions made in Yesso, Japan." 2. Sir R. H. Schomburgk, "Travels in Siam;" communicated by Sir R. J. Murchison.
TUES. ...Horticultural, 1. Election of Fellows, and a ballot for seeds.
Royal Inst., 3. Professor Owen, "On Fishes."
Syro-Egyptian, 7½. Rev. Mr. Cowper, "On the Golden Nanœa."
Civil Engineers, 8. Mr. John Murray, "On the North Sea, or German Ocean, with remarks upon some of its Estuaries, Rivers, and Harbours."
Medical and Chirurg., 8½.
Zoological, 9.
WED. ...Literary Fund, 2. Anniversary.
Society of Arts, 8. Prof. D. T. Ansted, "On the best method of representing the Mineral Kingdom and Mineral Manufactures in the International Exhibition of 1862."
Graphic, 8.
Microscopical, 8.
R. Soc. Literature, 8½.
Archæological Assoc., 8½.
THURS...Royal Inst., 3. Prof. Tyndall, "On Electricity."
Roy. Soc. Club, 6.
Philological, 8.
Royal, 8½.
Antiquaries, 8½.
FRI.......United Service Inst., 3. Lt.-Col. H. Garnet Man, "On Military Sketching."
Statistical, 4. Anniversary.
Royal Inst., 8. Mr. Latimer Clark, "On Electrical Quantity and Intensity."
SAT. .....Royal Inst., 3. Dr. E. Frankland, "On Inorganic Chemistry."

PARLIAMENTARY REPORTS.

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SESSIONAL PRINTED PAPERS.

Delivered on February 19th, 1861.

Par. Num.
14. Agricultural Labourers' Earnings—Return.
23. Cambridge University—Paper.
25. Bills—Appropriation of Seats (Sudbury and St. Alban's).
27. „ Irremoveable Poor.
28. „ Removal of Scotch and Irish Poor.
29. Tramways (Scotland).

Delivered on February 21st, 1861.

8. Duchy of Cornwall—Account.
20. Natural Vaccine Board—Copy of Report.

Delivered on February 22nd, 1861.

25. East India (Karen Mountain Tribes)—Copy of Report.
33. East India (Loan)—Return.
34. East India (Revenues)—Return.
41. Sugar and Molasses—Return.
42. Malt—Return.
29. Railway and Canal Bills.
31. Bills—County Franchise.
32. „ Superannuation (Officers of Prisons).
34. „ Nonconformist's Burial.
35. „ Burial Franchise.
36. „ Conveyance of Voters.
37. „ Church Rates Commutation.

Delivered on 23rd and 25th February, 1861.

26. Cambridge University—Papers.
35. Mint—Account.
45. Navy (Steam and Sailing Ships)—Return.
38. Trade and Navigation Accounts (Dec. 31, 1860).
43. West India Islands, &c. (Relief)—Account.
47. Church Rate Bills—Return.
48. Queen Anne's Bounty—Account.
50. East India (Negotiable Home Debt)—Account.
51. Railway and Canal Bills—First Report from Committee.
54. Committee of Selection—Second Report.
38. Bill—Bank of England Payments (Amended).

SESSION, 1860.

588. Election Petitions—Return.

Delivered on 26th February, 1861.

3. Corporal Punishment—Return.
46. Thames Conservancy Returns.
52. Bullion—Return.
56. Government Property.
39. Bill—Marriage Law Amendment.
China—(Expedition up the Yang-tze Kiang)—Further Correspondence.
United States—Correspondence.

Delivered on 27th February, 1861.

42. Bills—Registration of Births (Ireland).
45. „ Affirmations.

Delivered on 28th February, 1861.

39. Flogging (Navy)—Return.
61. Atlantic Steam Navigation Company (Return.)
29. Railway and Canal Bills—Nos. 1. Alcester; 2. Alva; 3. Atherstone and Whitacre; 4. Barnsley Coal; 5. Birmingham Canal Navigation; 6. Bishop's Castle; 7. Bishop Stortford, Dunmow, and Braintree; 8. Blackpool and Lytham, Blyth and Tyne; 9. Bognor, Bradford, Wakefield, and Leeds; 10. Bristol and South Wales Union; 11. Caledonian (Cleland, &c., Branches; Rutherglen and Coatbridge Branch; Stonehouse Branch); 12. Cardiff and Carephilly; 13. Chard and Taunton; 14. Cheshire Midland; 15. Cleveland; 16. Cocker-

mouth, Keswick, and Penrith; 17. Coleford, Monmouth, and Usk and Pontypool; 18. Cornwall; 19. Cradley, Heath, and Dudley; 20. Dublin, Wicklow, and Wexford; 21. Dumfries, Lochmaber, and Lockerby Junction; Dumfries, &c. (Deviation at Dumfries); 22. East Suffolk; 23. Ellesmere and Whitchurch—Board of Trade Reports.

43. Bills—Inclusive.

44. „ Marriages Validity.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, March* 1st, 1861.]

Dated 5*th February*, 1861.

298. W. Paton, Johnstone, Renfrew, N.B.—Imp. in coating, colouring, and glazing, or finishing laces, bands, straps, belts, and other similar articles, and in the machinery or apparatus employed therein.

Dated 11*th February*, 1861.

336. H. Louch, Love-lane, Shadwell—Imp. in the manufacture or spinning of yarns or threads from hemp, flax, cotton, or other fibrous materials, and in the apparatus employed therein.

Dated 12*th February*, 1861.

352. N. Frankenstein, Mincing-lane—Imp. in syphons for drawing off liquids from casks and other vessels. (A com.)
354. J. Bowron, Stockton-on-Tees—Imp. in the manufacture of bottles and other vessels of glass.
356. W. Corbett, Clayton, near Manchester—Imp. in the arrangement and construction of puddling and heating furnaces employed in the manufacture of iron and steel.

Dated 13*th February*, 1861.

360. W. Brown, Edgar-place, James-street, Mile-end—Imp. in the manufacture of frames, suitable for containing photographic and other portraits and pictures.
362. A. Ellissen, Moorgate-street—Improved apparatus for working the breaks of railway trains.
366. E. Cradock, High Holborn—Improved mechanism for improving the draught in open fireplaces, the same apparatus being applicable to deadening or extinguishing fires in such fireplaces.
368. T. T. Lawden and T. Jones, Birmingham—Certain imp. in breech-loading fire-arms.
372. W. Roberts, Millwall, Poplar—Imp. in portable or fire pumps, and apparatus connected therewith.

Dated 14*th February*, 1861.

375. G. Searby, Threadneedle-street—An improved steam guage.
377. P. S. Devlan, Elizabeth Port, New Jersey, U.S.—A new and useful bearing surface for all kinds of journal and axle boxes.
379. J. Garforth, Dukinfield, Cheshire—Certain imp. in metallic pistons.

Dated 15*th February*, 1861.

381. J. B. H. F. C. Nicolet, Brussels—A new system of ornamenting skin gloves.
383. M. A. Prenslan, Liverpool—Improved preparations for the cure and prevention of toothache, and the preservation of teeth.
384. G. J. Wainwright, T. Bradbury, and J. Lawton, Dukinfield, Cheshire—Imp. in machinery or apparatus for roving, slubbing, or spinning cotton and other fibrous materials.
385. W. H. Mansbridge, Camden-lodge, St. Paul's-road, Camden-town—Imp. in railway brakes.
386. A. Lecat, Crevecœur, France—Imp. in looms for weaving. (A com.)
387. A. Senior, Dumfries—Imp. in looms for weaving.

Dated 16*th February*, 1861.

389. J. Braham, Bristol—Imp. in spectacles and hand frames.
391. E. H. Barré and C. M. J. Blondel, Nantes, France—The manufacture of paper from a pulp obtained from wood, and all other vegetable produce of a woody nature, by means of the isolation of the cellular fibres.
393. L. H. Real, Paris—Imp. in weaving.
395. N. Nussey, Holbeck, Leeds—Imp. in machinery for preparing and combing wool, silk, cotton, flax, or other fibrous substances.

Dated 18*th February*, 1861.

397. R. Offord, jun., 79, Wells-street, Oxford-street—Imp. in the adaptation of india rubber, and the compounds thereof, to various parts of public and private carriages or vehicles.
399. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in sewing machines. (A com.)
401. C. Price, Wolverhampton, and E. Price, Berry Barr, Staffordshire—Imp. in locks and latches.

Dated 19*th February*, 1861.

403. J. B. Hawkins, North-street, Limehouse—Imp. in the construction of cocks for drawing off liquids and vapours, and for regulating the flow or passage thereof.
405. J. H. Brierley, 23½, Aldermanbury, London—A clasp, or fastener for belts, bands, or straps, or for imps. contained therein.
407. M. Paris, Hill Side, Wimbledon, Surrey—Imp. in fire-arms.
411. J. L. Jullion, Tynemouth—Imp. in the construction of the bearings and other rubbing surfaces of machinery. (A com.)
413. R. B. Burchell, Brooklyn, U.S.—An imp. in tighteners for the cords of curtains.
415. M. Henry, 84, Fleet-street—Imp. in furnaces. (A com.)

Dated 20*th February*, 1861.

417. E. Wilkins, 8, Bath-terrace, Camberwell New-road, Surrey—Imp. in the manufacture of boots, shoes, and goloshes, or other coverings for the feet, and in lasts or blocks for facilitating such manufacture.
419. J. Vavasseur, 28, Gravel-lane, Southwark—Imp. in steam generators or boilers.
421. J. Sutton, Sheffield—An imp. in the frames of spectacles.
423. W. Halse, Love-lane—An improved construction of reel for velvet or other ribbons.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

416. B. Nicoll, 42, Regent-circus, Piccadilly—An improved mode of treating needles used in sewing and other machines, applicable also to those parts of such machines that hold the needles, and applicable to all other descriptions of needles, and to scissors and to thimbles treated in like manner.—20th February, 1861.
451. Charles Eyland, Walsall, Staffordshire—Imp. in the manufacture of certain kinds of spectacle frames.—22nd February, 1860.

PATENTS SEALED.

[*From Gazette, March* 1st, 1861.]

March 1st.

2130. J. J. Stevens.
2133. G. P. Wheeler.
2134. G. P. Wheeler.
2145. M. Vergnes.
2147. W. R. Kinipple.
2148. J. Huggett.
2150. C. A. Schneider.
2152. W. H. Burke, senr., and W. H. Burke, jun.
2153. R. Wright.
2168. J. H. S. Wildsmith.
2169. J. Spratt.
2198. G. L. P. Coopman.
2235. M. Henry.
2271. G. Owen.
2401. C. Cowper.
3004. B. G. George.
3010. R. Mushet.
3030. R. Mushet.
3045. R. Mushet.
3054. A. Kyle.
3070. R. Mushet.

[*From Gazette, March* 5*th*, 1861.]

March 5*th*.

2177. W. E. Gedge.
2180. J. Wood.
2182. G. Zanni.
2183. F. J. Cantagrel.
2184. T. Thornton, E. Thornton, and J. Thornton.
2186. W. Wilkinson and H. T. Wright.
2187. T. Turpie.
2190. G. Wellman.
2207. J. Wright.
2208. J. Wright.
2213. E. Field.
2215. W. C. Somerville.
2216. G. Davies.
2237. D. Davies and J. Allen.
2238. A. Tronchon.
2335. W. Hargreaves.
2350. J. Winram.
2421. W. E. Newton.
2509. I. M. Singer.
2511. W. E. Newton.
2545. J. L. Jullion.
109. J. Sidebottom.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, March* 1st, 1861.]

February 25*th*.

386. A. J. Dessales.
441. C. F. Vasserot.
621. J. F. Brinjes, jun., and H. J. Collins.

February 27*th*.

410. A. Ripley.
416. W. H. Sleeboom.
425. G. A. Biddell.
439. H. G. Collins.

[*From Gazette, March* 5*th*, 1861.]

February 28*th*.

406. J. Billing.

March 1st.

404. W. E. Newton.
422. G. J. Parson & T. Pilgrim.
450. R. S. Bartleet.

March 2*nd*.

423. W. H. Graveley.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, March* 1st, 1861.]

February 27*th*.

523. J. Bour.

[*From Gazette, March* 5*th*, 1861.]

March 1st.

526. C. Nightingale.

March 2*nd*.

524. W. Vaughan and J. Scattergood.
945. W. Crosley & G. Goldsmith.